RFDS 3.00; FIRE FLOW

3.1; FIRE FLOW DETERMINATION

The following are guidelines for the determination of required fire flow in the city of Redmond. Required fire flow is that amount of water, which must be continuously supplied to a project site for fire fighting purposes and shall not include domestic supplies. Reference section `b' for the required duration of fire flow.

3.1.1; GUIDELINES FOR THE CALCULATION OF REQUIRED FIRE FLOW.

3.1.1.1; The Redmond fire department standard "form for the calculation of required fire flow" dated June 1993 shall be used to determine fire flow. Each step shall be followed in order. Only decimals shall be rounded off.

3.1.1.2; The Redmond fire department standard "basic flow chart" dated June 1993 shall be used with the above form.

3.1.1.3; The Redmond fire department standard "credits and surcharges for the determination of required fire flow" dated June 1993 (revised August 1996) shall be used with the above form. The Redmond Fire Marshal shall make all final determinations as to the applicability of credits or surcharges based upon evaluation of the project proposal and this reference.

3.1.1.4; When considering exposures generally a charge is added for each of four directions. Distance to other buildings on the same property or to property lines of adjacent property shall be considered as the exposure distance. Where a property line is adjacent to a public right of way (street or railroad) the exposure distance may be taken to the property line on the opposite side of the right of way. The Fire Marshal may assess additional surcharges for exposures not identified above where in his opinion these would require the expenditure of water resources during a fire incident (i.e. stands of trees, equipment or vehicle storage). Sides entirely below grade shall not accrue an exposure surcharge.

3.1.1.5; Basements and parking garages shall be included as part of the total gross square footage. A basement, or first story, parking garage may be considered as a separate building for fire flow calculation purposes, when all of the conditions of UBC 311.2.2.1 ('97 edition) and all of the following conditions are met:

1. The entire structure is protected by an approved, automatic fire sprinkler system;
2. The parking garage is provided with quick response sprinkler heads in all areas allowed by standards;
3. An approved interior standpipe is provided; and
4. For an enclosed or partially enclosed garage, an approved smoke removal system is provided.

When all of these conditions are met, no exposure factor will be calculated between the garage and the separate building.

3.1.1.6; Structures separated by 10 feet or less shall be considered as one fire area. Separation walls shall not be considered as dividing two fire areas in any initial fire flow calculation. They may be considered in overall fire flow reduction after other means have been exhausted and when approved by the Fire Marshal.

3.1.1.7; One and two family dwellings in typical residential developments shall be considered to have a required fire flow of 1500 gpm.

3.1.1.8; Where wood shingle roof designs contribute to the potential spread of fire a surcharge of 500 gpm may be added.

3.1.1.9; Total required fire flow should not be designed to exceed 3500 gpm. The Fire Marshal shall determine the applicability of all identified or potential credits and surcharges on a site-specific basis.

3.1.1.10; Where multiple buildings are located on one site the fire flow provided throughout the site shall not be less than the largest required fire flow.

3.1.1.11; Where future buildings or phases are anticipated the required flow shall be based upon the future build out. Where this is not possible or is undesirable the project developer assumes the responsibility for all future improvements necessary to provide for additional fire flow prior to the additional phase or construction.

3.1.1.12; Fire alarm systems shall not be considered as providing a credit in any initial fire flow calculation. They may be considered in sprinklered buildings for overall fire flow reduction after other means have been exhausted and when approved by the Fire Marshal. Credit for an AFA system shall not exceed 25%.

3.1.2; GUIDELINES FOR THE DURATION OF REQUIRED FIRE FLOW.

REQUIRED FIRE FLOW	DURATION	TOTAL
1,000 gpm	2 hrs.	120,000 gallons
1,250 gpm	2 hrs.	150,000 gallons
1,500 gpm	2 hrs.	180,000 gallons
1,750 gpm	2 hrs.	210,000 gallons
2,000 gpm	2 hrs.	240,000 gallons
2,250 gpm	2 hrs.	270,000 gallons
2,500 gpm	2 hrs.	300,000 gallons
3,000 gpm	3 hrs.	540,000 gallons
3,500 gpm	3 hrs.	630,000 gallons
4,000 gpm	4 hrs.	960,000 gallons
4,500 gpm	4 hrs.	1,080,000 gallons
5,000 gpm	5 hrs.	1,500,000 gallons
5,500 gpm	5 hrs.	1,650,000 gallons
6,000 gpm	6 hrs.	2,160,000 gallons
7,000 gpm	7 hrs.	2,940,000 gallons
8,000 gpm	8 hrs.	3,840,000 gallons
9,000 gpm	9 hrs.	4,860,000 gallons
10,000 gpm	10 hrs.	6,000,000 gallons
11,000 gpm	10 hrs.	6,600,000 gallons
12,000 gpm	10 hrs.	7,200,000 gallons

3.1.3; BASIC FLOW CHART

DATE JUNE 1993

Page 1; Type V-N, lll-N, & II-N

Type V-N	
Gross Area (Ft.^{2})	GPM
to 500	500
to 1,100	750
to 1,700	1000
to 2,600	1250
to 3,600	1500
to 4,800	1750
to 6,200	2000
to 7,700	2250
to 9,400	2500
to 11,300	2750
to 13,400	3000
to 15,600	3250
to 18,000	3500
to 20,600	3750
to 23,300	4000
to 26,300	4250
to 29,300	4500
to 32,600	4750
to 36,000	5000
to 39,600	5250
to 43,400	5500
to 47,400	5750
to 51,500	6000
to 55,700	6250
to 60,200	6500
to 64,800	6750
to 69,600	7000
to 74,600	7250
to 79,800	7500
to 85,100	7750
= or > 85,101	8000

Type III-N & II-N	
Gross Area (Ft.^{2})	GPM
to 1,200	500
to 2,400	750
to 3,900	1000
to 5,800	1250
to 8,200	1500
to 10,900	1750
to 13,900	2000
to 17,400	2250
to 21,300	2500
to 25,500	2750
to 30,100	3000
to 35,200	3250
to 40,600	3500
to 46,400	3750
to 52,500	4000
to 59,100	4250
to 66,000	4500
to 73,300	4750
to 81,100	5000
to 89,200	5250
to 97,700	5500
to 106,500	5750
to 115,800	6000
to 125,500	6250
to 135,500	6500
to 145,800	6750
to 156,700	7000
to 167,900	7250
to 179,400	7500
to 191,400	7750
= or > 191,401	8000

(for TYPE II use 6000 GPM maximum)

Note: For type V-1hr., III-1hr., or II-1hr. use the base flow figure for non-rated (-N) construction. A credit for 1hr. construction is allowed as the second step on the "form for the calculation of required fire flow".

Page 2; Type II-FR, IV, & I

Type II-FR & IV Heavy Timber	
Gross Area ($Ft.^2$)	GPM
to 1,900	500
to 3,700	750
to 6,100	1000
to 9,100	1250
to 12,700	1500
to 17,000	1750
to 21,800	2000
to 27,200	2250
to 33,200	2500
to 39,700	2750
to 47,100	3000
to 54,900	3250
to 63,400	3500
to 72,400	3750
to 82,100	4000
to 92,400	4250
to 103,100	4500
to 126,700	5000
to 139,400	5250
to 152,600	5500
to 166,500	5750
> 166,500	6000

Type I	
Gross Area ($Ft.^2$)	GPM
to 3,300	500
to 6,600	750
to 10,900	1000
to 16,200	1250
to 22,700	1500
to 30,200	1750
to 38,7900	2000
to 48,300	2250
to 59,000	2500
to 70,900	2750
to 83,700	3000
to 97,700	3250
to 112,700	3500
to 128,700	3750
to 145,900	4000
to 164,200	4250
to 203,700	4750
to 225,200	5000
to 247,700	5250
to 271,200	5500
to 295,900	5750
> 295,900	6000

3.1.4; FORM FOR THE CALCULATION OF REQUIRED FIRE FLOW DATE JUNE 1993

PROJECT:_____ DATE:_____

LOCATION:_____

DEVELOPER:_____ AGENT:_____
PHONE:_____
ARCHITECT:_____ AGENT:_____
PHONE:_____

BUILDING INFORMATION:
NUMBER OF STORIES:_____FOOTPRINT:_____SQ.FT.
AREA OF MEZZANINES OR PARTIAL FLOORS:_____SQ.FT.
TOTAL GROSS AREA OF BUILDING:_____SQ.FT.
TYPE OF CONSTRUCTION: (CIRCLE ONE)
I II-FR II-1hr.* II-N III-1hr.* III-N IV
V-1hr.* V-N

1. BASIC FLOW FROM REDMOND FIRE DEPT. STANDARD FLOW CHART; USE TOTAL GROSS AREA. FOR NUMBERS BETWEEN AN AREA RANGE USE THE HIGHER GPM FIGURE,
DO NOT INTERPOLATE :_____gpm

2. IF 1-hr. AS IDENTIFIED WITH * ABOVE 250gpm:_____gpm
subtotal:_____gpm

3. ADD ___% SURCHARGE FOR HIGH FIRE LOAD or
SUBTRACT ___% CREDIT FOR LOW FIRE LOAD PER R.F.D.S.
SURCHARGE/CREDIT CHART; NEITHER TO EXCEED 25%: +/-_____gpm
subtotal:_____gpm

4. SUBTRACT 50% FOR APPROVED SPRINKLER SYSTEM:_____gpm
subtotal:_____gpm

5. FOR EXPOSURES MULTIPLY BY 1.00 TO 1.75** : _X 1._____
**[to determine exposure factor add a
percentage for each of four directions
(express as a decimal not to exceed .75) and add 1]

conversion table:	ft. %
0-10ft. = 25%	N=____=____
11-30ft. = 20%	E=____=____
31-60ft. = 15%	S=____=____
61-100ft. = 10%	W=____=____
101-150ft.= 5%	subtotal:____%

(.75 maximum) subtotal:_____gpm

TOTAL REQUIRED FIRE FLOW:_____ gpm
AVAILABLE FIRE FLOW:_____ gpm

PER:_____OF:_____

3.1.5; CREDITS AND SURCHARGES FOR THE DETERMINATION OF REQUIRED FIRE FLOW

The following are credits and surcharges based upon the major building use as defined by the uniform building code categories listed below. Any category not identified shall be assumed to have no credit.

CREDITS:

-25% . .	R-1
	LC
-20% . . .	I-1,2,3
-15% . . .	E-3
-10% . .	A-4
	E-1,2
0	B
	F-2, S-2
	M
	OTHER USES NOT SPECIFIED

SURCHARGES:

+10% . . .	S-1	with or without high storage of Class I commodities
	F-1	with or without high storage of Class I commodities
	S-3	Repair Garages
	H-4,5,6,7	
+15%	S-1	with high storage of Class II commodities
	F-1	with high storage of Class II commodities
+20% . . .	S-1	with high storage of Class III commodities
	F-1	with high storage of Class III commodities
	H-3	
+25% . . .	S-1	with high storage of Class IV commodities
	F-1	with high storage of Class IV commodities
	H-1,2	

Date: June 1993
Revised & modified August 1996 to 1994 edition UBC use categories